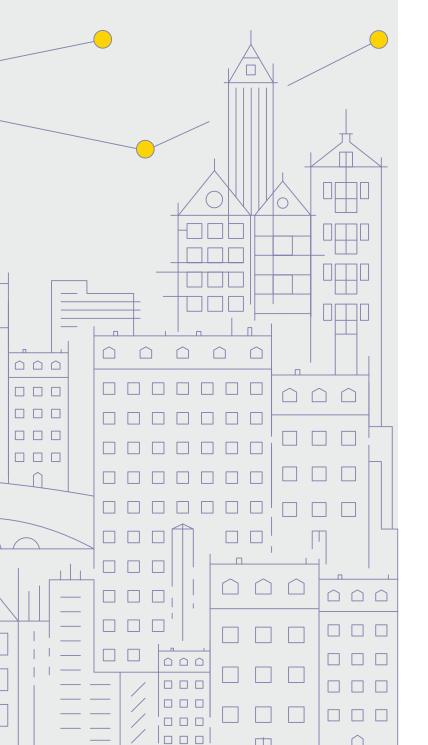# Deloitte.

Using public-private partnerships to advance smart cities

Tiffany Dovey Fishman

Steve Hamilton

About

Tiffany Dovey Fishman
Tiffany is a senior manager with the Deloitte Center for Government Insights. Her research and client work focuses on how emerging issues in technology, business, and society will impact organizations. She has written extensively on a wide range of public policy and management issues, including infrastructure and smart cities. She is the author of *Partnering for value: Structuring effective public-private partnerships for infrastructure, The rise of mobility as a service: Reshaping how urbanites get around and Smart mobility: Reducing congestion and fostering faster, greener, and cheaper transportation options.* Her work has appeared in a number of publications, including Public CIO and Governing.
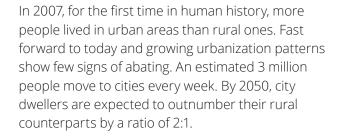
Michael Flynn
Michael Flynn is the Global Financial Advisory Public Sector Leader for Deloitte. He also leads the Deloitte EMEA Infrastructure & Capital Projects practice and focuses on advising public, private and banking team clients on finance raising, restructuring and refinancing of both project finance and corporate debt transactions including the development of government and infrastructure assets, real estate, energy, and renewable energy assets. This advice has included the incorporation of 'smart' into traditional infrastructure and considering value capture opportunities including asset recycling for government clients.

Michael is a member of the United Nations Economic Commission for Europe (UNECE) PPP Business Advisory Board and the International Project Finance Association Council in Ireland. Michael is a member of the Deloitte Insights board.

About the Deloitte Center for Government Insights

The Deloitte Center for Government Insights shares inspiring stories of government innovation, looking at what's behind the adoption of new technologies and management practices. We produce cutting-edge research that guides public officials without burying them in jargon and minutiae, crystalizing essential insights in an easy-to-absorb format. Through research, forums, and immersive workshops, our goal is to provide public officials, policy professionals, and members of the media with fresh insights that advance an understanding of what is possible in government transformation.

Introduction

In 2007, for the first time in human history, more people lived in urban areas than rural ones. Fast forward to today and growing urbanization patterns show few signs of abating. An estimated 3 million people move to cities every week. By 2050, city dwellers are expected to outnumber their rural counterparts by a ratio of 2:1.

Saddled with legacy infrastructure and limited budgets, many urban areas are struggling to keep pace with such rapid growth. The result is increased congestion, reduced quality of life, lost economic potential, and negative health outcomes.

Cities around the world are increasingly looking to implement initiatives that respond to these challenges. But limited funds constrain progress. Just 16 percent of cities are able to self-fund required infrastructure projects. As a result, cities are enlisting the support of private and non-profit partners to advance their smart city agendas.

In this article, we examine the creative ways municipalities are using private and non-profit sector participation to advance their smart city agendas and distill the lessons learned for other cash-strapped cities seeking to overcome their own funding and financing barriers.

Partnering for smart city initiatives

From initiatives aimed at improving public health and expanding Wi-Fi access to promoting affordable housing, municipalities are forging innovative partnerships to improve the quality of life for their residents and as a means of refurbishing and modernizing aging infrastructure assets. Their experiences show how cities can overcome traditional barriers to funding and financing smart city projects by demonstrating new technology's potential to reduce costs, recycling existing and legacy infrastructure assets, unlocking value, and bringing a critical mass of players together to spur economic development.

Leveraging private market value in Louisville, KY
Louisville, Kentucky had gained a reputation as one of the worst cities for breathing disorders. To attack that problem, the city developed AIR Louisville, a public-private partnership that uses data analytics to inform the public on triggers that aggravate asthma. The initiative used private grants in its early phases for funding. Since then, technology purchases by private companies that stand to benefit from the initiative have allowed AIR Louisville to expand further.

AIR Louisville initially developed from a partnership among:

- ✓ The City of Louisville
- ✓ Propeller Health
- ✓ The Institute for Healthy Air, Water and Soil
- ✓ Local employers
- ✓ Healthcare providers
- ✓ Local advocacy groups

The technology behind the project is a sensor that attaches to an asthma inhaler. Propeller Health manufactures the sensors, which collect data about the surrounding environment each time an individual uses the inhaler. Consumers can view reporting data through a smartphone app. The user can then better identify personal respiratory triggers—time of day, location, temperature, pollen count, and pollution. This data is also communicated to healthcare providers, enabling them to tailor a personalized plan for managing participants' asthma and chronic obstructive pulmonary disease. In its first year, AIR Louisville helped participants to reduce their asthma rescue inhaler use by 82 percent, more than double their number of symptom-free days, and gain increased control of their asthma for those with uncontrolled asthma at the outset of the pilot.

Propeller Health aggregates the data gathered from all the sensors in use and provides this to the city under an agreed data sharing plan. The city uses this data to create a map of asthma risk for each neighborhood in Jefferson County. This map is used to inform various initiatives aimed at improving air quality in the county's asthma hotspots—everything from increasing tree coverage and identifying alternative truck routes to reduce diesel emissions, to considerations of city-wide zoning changes to reduce the health impacts of highways and industrial emissions.
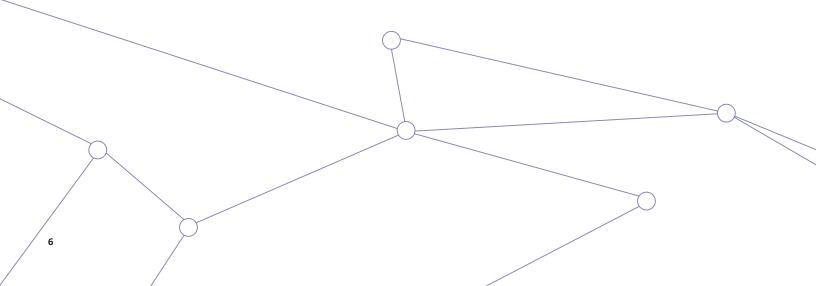
Dr. Ted Smith, Chief Innovation Officer for the city of Louisville, collaborated with Propeller Health to develop the data sharing plan. He arranged for private local philanthropies to purchase 300 sensors from Propeller Health for free distribution to city residents. This proof-of-concept phase confirmed that the anonymous data shared with the city could inform the public about the status of the environment using tools such as a heat map.

In the second phase, the city approached the Robert Wood Johnson Foundation (RWJF) for additional funding. The usefulness of the aggregated data correlated directly with how many sensors operated in the city. The RWJF supported AIR Louisville with a $750,000 grant to acquire an additional 2,000 sensors. The grant stipulated that AIR Louisville would track the healthcare cost savings of individuals who used the sensors.

In phase three, area companies received the health cost savings research. Since companies have an incentive to reduce healthcare costs, they have begun to purchase Propeller Health sensors, providing them to employees who need them as part of their health plans. With the data sharing plan still in place, the city benefits from additional deployed sensors without purchasing the devices directly.

Giving asthma sensors to employees will help employers save money on healthcare costs. Once the private grant money has been depleted, it is anticipated that the private market will sustain the purchase and use of the sensors technology. As the number of deployed sensors grows, so will the data pool the city draws upon to support policy decisions, increasing the value of its analytics.

Many other cities could benefit from a project like AIR Louisville. Based on data from roughly 3,000 cities, nearly 80 percent of people living in urban areas are exposed to air pollution that exceeds World Health Organization recommendations. That exposure increases the risk of a variety of respiratory diseases, heart disease, stroke, and lung cancer. In the OECD alone, between 2005 and 2010, ambient air pollution caused nearly a half million deaths. Based on Louisville, success in this case is built around a collaboration between the public and private sectors with both benefiting from the data collection, social/health benefits, and cost savings.

Asset recycling in New York City and Toronto
As the rise of smart phones started to make payphones obsolete, New York City faced a problem—an aging network of 8,400 public phones that attracted fewer and fewer users. Despite the pay phones having reduced usage, the phone booths still generated substantial revenues for the city. By serving as billboards for advertisers, they brought in just over $17 million in 2013. However the city recognized that the annual profits were decreasing and the booths also presented problems: they frustrated residents, blocked pedestrian traffic, and appeared anachronistic in the world of modern communications.

In 2013, the New York City Department of Information Technology and Telecommunications (DoITT) requested proposals to replace its aging payphones. The city awarded the contract to the CityBridge Consortium, a partnership that includes Qualcomm, Titan, and Control Group. Control Group and Titan have since merged to form a company called Intersection. Thanks to this partnership, in 2014 New York City started replacing the obsolete payphones with smart kiosks—called "Links"—that provide free Wi-Fi, maps, transportation updates, video calls, device charging, and more. CityBridge pays for and operates the entire LinkNYC system at no cost to the city and offers the services to users free of charge, funded with the support from advertising revenues.

CityBridge incurred an estimated $200 million to install the Links. The city receives 50 percent of the gross advertising revenue, or $17.5 million (whichever is higher), from the CityBridge Consortium each year. When complete, 7,500 Links will be installed, making it the most expansive system of Wi-Fi hotspots. The city predicts that its share of advertising revenues will come to $500 million over the initiative's first 12 years.

In addition to producing substantial income for the city, LinkNYC is also expected to create 100–150 full-time jobs and 650 support jobs once CityBridge installs all the Links.

While not every city has thousands of payphones to convert, this example points to the idea that cities may partner with private companies to convert or upgrade physical public assets in ways that increase the value those assets provide.

Toronto is taking this approach in an effort to revitalize part of the city's waterfront. In 2016, Toronto identified a portion of city-owned lands along the waterfront that it considered surplus and issued a request for proposals to prospective developers. The city ultimately sold the land, on Queen's Quay, to a consortium of developers for $260 million.

The terms of the sale call for the developers to work with the city to create affordable housing, public spaces, heritage conservation sites, and office towers that will include new headquarters for the Liquor Control Board of Ontario. The city will use the $260 million to fund transit and transportation infrastructure projects. Other variants of this model have also been used around the world from asset disposal such as Toronto to joint development partners in other cities. The model used will depend on the level of risk the city wishes to retain on the ultimate value generated for the recycled asset

Unlocking data value in Kansas City
Kansas City had already earned a reputation as one of the smartest cities in the U.S. when, in 2014, Cisco and Sprint approached its government to propose a free public Wi-Fi and interactive kiosk project. The partners would install 25 kiosks along the city's downtown streetcar route. Kansas City had installed this new, 2.1-mile system to reduce traffic congestion and encourage greater foot traffic to downtown businesses.

The city and the private partners reached an agreement in June of 2015. By early 2016, the city had installed all 25 kiosks. Citizens can use the kiosks to access the web through their connected devices, free of charge. They can also interact with kiosks to find information about city services, current events, transportation, local business information, local history, and entertainment. In addition, the kiosks operate as an emergency alert system, enhancing public safety.

Kansas City provided $3.7 million towards the overall capital cost of $16 million for the project, taking the money from various parts of the existing budget. The city expects to recoup its share of the capital costs by collecting advertising revenue from the kiosks. The city government shares advertising revenue equally with its advertising manager, Smart City Media. Kansas City expects to fully recoup its capital costs in four to five years. The revenue sharing model will then shift to give 25 percent to the city, while Smart City Media retains the rest.

Cisco and Sprint supplied the remaining $12.3 million to cover hardware and maintenance costs. The private investors do not receive any direct monetary return on investment. Instead, they receive exclusive access to usage data from the kiosks. Sprint has used the collected Wi-Fi data to test the viability of expanding its Wi-Fi coverage to other areas of the city.

The kiosk project is one example of how Kansas City hopes to use big data to generate benefits for taxpayers. While Cisco and Sprint take advantage of usage data collected from the kiosks, the city will use data from other smart city projects to make its operations more efficient. City workers will have the ability to quickly respond to maintenance requests for streets, water lines, and other infrastructure. Big data currently supports live maps, which will allow commuters to find available parking quickly and easily.

Many companies seek ways to gain access to data beyond their current customer bases. Kansas City illustrates how cities can use data collection to incentivize private investment in projects that create value for citizens. Most cities either already have a wealth of valuable data or have the capacity to facilitate its collection. With thoughtfully negotiated security and contract terms, a city's residents can benefit from free internet access, and companies can benefit from the abundance of user data these projects provide.

Force multiplier effect in Columbus
In 2016, the U.S. Department of Transportation awarded Columbus, Ohio, $50 million as the winner of its "Smart City Challenge." Columbus prevailed over more than 77 other applicant cities for this award. The Columbus proposal for the grant had a holistic vision: improve access to jobs through expanded mobility, improve neighborhood safety, provide reliable transportation, and adopt environmentally-sustainable development methods.

Winning the challenge helped reinforce Columbus' Smart City plans and attracted more $360 million in private investment for its Smart Columbus Acceleration Fund. The fund will support Smart City initiatives city wide. Columbus' plans include initiatives in transit, employment opportunities, and energy sustainability.

Columbus started developing strategic partnerships with private entities while it was still contending for the Smart Cities grant. The Columbus Partnership— a non-profit comprised of 65 Columbus area CEOs— pledged financial support to increase project viability and demonstrate community support for the initiative. Private partners inside and outside of Ohio have continued to contribute to the Smart Columbus Acceleration fund, including Cardinal Health, Drive Capital, AT&T, and Honda.

When the DOT awarded the grant to Columbus, it minimized risk for businesses interested in contributing funds. Private partners were more inclined to donate, since the grant indicated that the Smart Columbus initiative was viable, well-developed, and likely to succeed.

Some partners receive direct benefits from their contributions in the form of user fees and cost savings. Others will not receive a direct return on investment but have embraced the indirect benefits, stating that when the city thrives, business will too.

Columbus' success in the DOT Smart City Challenge brought it national attention. But other U.S. cities not specifically seeking large federal or private grants can use Columbus' strategy of building an innovation ecosystem. While the federal grant helped to attract additional support, the local pledges of financial support served as a force multiplier as well.

This type of ecosystem development enhances the power and credibility of a city-directed implementation model for smart city projects. Rather than city leaders directing initiatives through the usual procurement relationships, they can encourage diverse stakeholders to participate in the preliminary stages. This strategy increases the odds that large private investors will see potential in the city or that the city will be a contender for large grants. Similar grants available to cities include the IBM Smarter Cities Challenge, National Science Foundation, 100 Resilient Cities from the Rockefeller Foundation, and the Innovation Teams from Bloomberg Philanthropies.

Getting started

Whatever kind of smart city initiative a local government pursues, several key practices can set the stage for successful public-private collaborations. Here are a few ways to foster productive partnerships:

Start with the end in mind.
Define the desired outcomes at the outset of the project. Getting clarity around the ultimate objectives you're trying to achieve and the needs you're trying to address is a necessary first step.

Inventory your available assets.
Take stock of the assets you have at your disposal. Are there particular assets that could be recycled? If so, are you permitted to recycle the asset or are there barriers to transferring ownership or management of the asset? Once a public sector entity has established what it's permitted to do, the next step is understanding the relative value of the assets to both the city and to the private sector.

Understand the business model.
What is the proposed revenue model? What are the related business risks? Projects need to be financially sustainable, which, in some cases, may require scale beyond your city.

Appoint a champion with clear decision-making authority.
A clear decision-maker, often a chief innovation officer or equivalent leader, within city government can streamline planning and aid in building key relationships. The city-led approach assists in project implementation by establishing a public champion to act as a face for the city.

Build local support.
When smart city projects have local support, cities are better positioned to attract private partners. Residents embrace projects that have clear social benefits and such projects appeal to businesses' social responsibility goals. The likelihood of receiving philanthropic support improves when the project serves the needs of a population and aligns with a private partner's mission. In the case of Columbus, the city prioritized assisting underserved residents and the business community's pledge served as a vote of confidence which helped to secure the DOT grant. AIR Louisville's project aimed to improve the health of the residents, attracting support from the RWJ Foundation. LinkNYC and Kansas City's Wi-Fi kiosks provide a free, convenient service to tourists and residents.

Develop a business case that clearly lays out the value to potential partners.
A city must present a business case that clearly articulates the potential value of the project to private partners. The value can take different forms, from direct returns on investment to indirect benefits like greater economic development. With LinkNYC, the CityBridge Consortium received direct value in the form of advertising revenue. In Kansas City, Sprint contributed in order to access profitable usage data. For Columbus, while many businesses will not receive a direct return, the improvements to the city indicate future financial gains for the private sector. AIR Louisville saved participating firms an average of $930 per year for each asthmatic employee.

Create a third-party entity.
Establishing a third-party entity encourages role clarity, political feasibility, and eases procurement. A third-party entity can help partners and cities navigate the complex structure of both city governments and private corporations. Columbus relied on the Columbus Partnership to raise significant funding for the initiative. LinkNYC delegated the operations of the Links to the CityBridge Consortium. Louisville established AIR Louisville to coordinate the transfer and analysis of complex health data. Third parties provide a clear platform for decision-making and planning.

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